AMS 325
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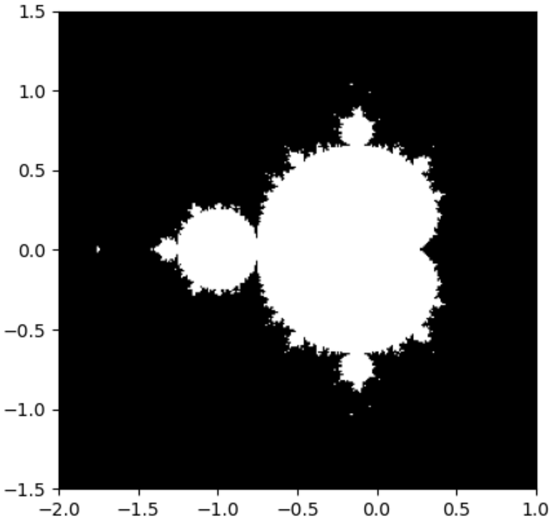
HW4 Project Report

In this project, a Mandelbrot set and Markov Chain were created with python and uploaded to github, found at: https://github.com/hectic4491/AMS325_HW4.

The mandelbrot.py script contains a function that generates a grid of *n* complex points, *c,* and checks whether they exist outside of the *threshold* after *N_max* iterations. I start by initializing the grid of '*n x n'* complex points called *c*. Then I initialize a boolean mask grid of the same '*n x n*' size populated with 1s, or, equivalently, *Trues*. Then, iterate through the grid of points *c* and check if they ever break the *threshold* after *N_max* iterations. Points that break the threshold get converted to 0s, or equivalently, *Falses* on the mask. Lastly the mask is plotted to reveal the Mandelbrot set. Setting n=300 produces this image:



For the marvov_chain.py script I, unfortunately, only had time to go through some of the tasks. In the function *p_vector* I created a random *n* sized probability vector whose elements sum to 1. In the function *t_matrix* I use the same process and generate *n* of these vectors and contain them into a matrix. The function *nth_state* takes a probability vector and a transition matrix to determine the probability of the vector after n iterations. Lastly the eigen_matrix computes the eigenvector of a transition matrix after n iterations.